Flood News for Michigan Floodplain Managers

A newsletter of the
Land and Water Management Division
Michigan Department of Environmental Quality
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Steven E. Chester, Director Jennifer M. Granholm, Governor Fall 2005
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Special Edition – Includes Dam Safety News

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What's Inside:

Something New

This special edition of the newsletter brings with it a change. Dam safety and floodplain management have common interests that can be well served by a joint newsletter. This is particularly obvious when it is recognized that many dam owners are communities that already receive this newsletter. So, we hope that our efforts to provide news and information on both programs into one format is beneficial to our readers. Dam Safety News starts on page 9. Please give us feedback on what you think of this format.

Communities Missing Out on Free Dollars for Their Citizens?

Co-authored with Scott Cofoid, Michigan ISO/CRS Specialist

What were the chances of earning interest from a Certificate of Deposit at a 5 percent annual interest rate the last few years? Not very high. I believe there were many people that would have jumped at the chance to do so, and I know they would be standing in line to do so if they could earn 10 percent annual interest on an investment.

What does this have to do with the National Flood Insurance Program (NFIP)? FEMA does not have a Certificate of Deposit savings program; however, it does have the Community Rating System (CRS) program. All of Michigan's communities have the opportunity to join the NFIP. A community's wise decision to join the NFIP makes available to each of its citizens reasonably priced flood insurance to protect them from potential structural and contents losses caused by flooding. Just as insurance companies have "safe driver", "multiple policy", and other ways to lower policy premiums, the NFIP has an incentive program to lower premiums: the CRS program. The incentive program is based upon a community having a well-managed and effective floodplain development program to minimize flood impacts on its citizens.

Michigan has 1,776 communities (villages, cities, and townships). Currently, 777 of these communities are participating in the NFIP, and all of their citizens have available to them reasonably priced flood insurance. Of the 777 participating communities, the top 25 policy count communities that **do not** participate in the CRS have a total of 10,201 flood insurance policies, representing an annual premium value of $5,916,000. A 5 percent annual savings is $295,800: a 10 percent annual savings is $591,600. That is how much money (possibly even more) the citizens in these 25 communities would be saving if the communities were in the FEMA NFIP Community Rating System (CRS). The program has a premium rate reduction scale of up to 45 percent, which is based on a sliding scale of effort by a community to administer its floodplain development program.

Another way a community can realize savings with the CRS program is that it encourages mitigation activities, so people are prepared before disasters happen. In fact, a recent independent study has determined that, on average, mitigation activities, such as elevating structures, save the country $4 for every dollar spent. That means the money spent up front on mitigation activities will far outweigh what would have been spent when a flooding event occurs in your community.

A huge advantage that Michigan communities have over most other states is the current state building construction code has strong floodplain construction code criteria. This along with other state administered programs regulating floodplain development creates a situation where each Michigan NFIP-participating community will automatically qualify for the first level (level 9) of CRS flood insurance premium reduction of 5 percent. The next level (level 8) provides a premium reduction of 10 percent and can be achieved with a little more effort.

Fifteen Michigan communities are CRS communities, and their citizens have realized premium reductions ranging from 5 to 20 percent. Currently, six new communities are working with a FEMA CRS representative to enter into the program. If your community is one of Michigan's 777 NFIP communities that are not in the CRS, then please learn more about the CRS and enroll so your flood insurance policy holders can realize an immediate 5 percent reduction in their annual insurance premiums.

A very recent example of what a community can do for its citizens is demonstrated by the Village of Saugatuck. Saugatuck has just been accepted into the CRS program, and their level of floodplain management program qualifies for the 10 percent reduction in premium rates for their citizens.

For personal contact and direct one-on-one assistance in learning more about the CRS, you may contact:

Scott Cofoid of Insurance Services Office, Inc. (ISO)
1126 Schuyler Street
Peru, Illinois 61354
Phone/Fax: 815-220-1002
Cell: 815-715-9233
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What is the NFIP's Community Rating System Program?

(Information obtained from the FEMA Website)
Co-authored with Scott Cofoid, Michigan ISO/CRS Specialist

The Community Rating System (CRS) was implemented by FEMA in 1990 as a voluntary program for recognizing and encouraging community floodplain management activities that exceed the minimum NFIP standards. When an NFIP community also becomes a CRS community, its citizens' flood insurance premium rates are adjusted to reflect the reduced flood risk resulting from community activities that meet the three goals of the CRS:

1. Reduce flood losses
2. Facilitate accurate insurance rating; and
3. Promote the awareness of flood insurance

When a community participates in the CRS, everyone benefits, including those who don't live or own property in a floodplain. Even when there is no flooding, a community's public information and floodplain management efforts can improve the quality of life, protect the environment, make people safer, and save everyone money. Community actions taken under the CRS will:

1. Save lives.
2. Prevent property damage.
3. Avoid lost jobs and economic devastation caused by flooding of offices, factories, farms, stores, and other businesses.
4. Prevent damage and disruption to roads, schools, public buildings, and other facilities.

No fee is charged for a community to apply for the CRS. The only costs are those of implementing creditable floodplain management activities and the staff time needed to prepare the CRS Application. A CRS representative will even help prepare the application.

Reduced flood insurance rates are only one of the rewards a community receives from participating in the CRS. There are several other benefits:

First, the CRS floodplain management activities enhance public safety, reduce damage to property and public infrastructure, avoid economic disruption and losses, reduce human suffering, and protect the environment.

Second, a community can evaluate the effectiveness of its flood program against a nationally recognized benchmark.

Third, technical assistance in designing and implementing some activities is available at no charge.

Fourth, the CRS gives a community added incentive to maintain its flood programs over the years. The fact that the community's CRS status could be affected by the eliminating a flood-related activity or weakening the regulatory requirements for new development should be taken into account by the governing board. A similar system used in fire insurance rating has had a strong impact on the level of support local governments give to their fire protection programs.

Fifth, implementing some CRS activities, such as floodplain management planning, can help a community qualify for certain Federal assistance programs.

Sixth, implementing CRS activities such as buy-outs, elevation projects, and even floodproofing, can save enormous amounts of money in your community's next flood. In fact, a recent independent study has determined that, on average, these mitigation activities save the country $4 for every dollar spent. That means the money you spend up front on mitigation activities is far less than what would have been spent when a flooding event occurs in your community.

To earn CRS credit, your community can do things such as:

1. Preserve open space in the floodplain;
2. Enforce higher standards for safer new development;
3. Maintain drainage systems; and
4. Inform people about flood hazards, flood insurance, and how to reduce flood damage.

Your community is already doing many of these things. To get credit, you must have had a Community Assistance Visit from your local DEQ office that shows your community is in compliance with NFIP standards, and then you simply call the Michigan ISO/CRS Specialist for an evaluation of your programs. Once your programs are verified, FEMA provides the flood insurance premium discounts. The amount of your discount depends on what your community does.

Once it has submitted its CRS Application, a community must continue to implement its credited activities to keep its classification. Specifically, a community is responsible for:

1. Designating someone who is familiar with the agencies that implement CRS activities as the community's CRS Coordinator.
2. Cooperating with the ISO/CRS Specialist and the verification procedures.
3. Recertifying each year that it is continuing to implement its activities.
4. Submitting the appropriate documents with its recertification.
5. Advising FEMA and its ISO/CRS Specialist of modifications in its activities.
6. Maintaining elevation certificates, other permit records, and old Flood Insurance Rate Maps (FIRMs) forever.
7. Maintaining other records of its activities for five years, or until the next verification visit, whichever comes sooner.
8. Participating in the cycle verification process.

Communities will receive periodic updates to the CRS Coordinator's Manual and other CRS materials. They are encouraged to order the background publications, attend CRS workshops, and ask their ISO/CRS Specialists for help understanding the CRS credit criteria for their current and planned activities.

The FEMA NFIP website for the CRS is: http://training.fema.gov/EMIWeb/CRS/index.htm

For personal contact and direct one-on-one assistance in learning more about the CRS, you may contact:

Scott Cofoid of Insurance Services Office, Inc. (ISO)
1126 Schuyler Street
Peru, Illinois 61354
Phone/Fax: 815-220-1002
Cell: 815-715-9233
Scofoid@iso.com

2006 MSFA 19th Annual Conference Was a Good One

Attendee comments on the 2006 conference at the Grand Traverse Resort, in Acme:

- "Good range of subjects this year."
- "Overall, a very good conference."
- "Great job!"
- "Floodplain management (101 workshop) … was a good forum for discussion and review of the basic concepts."
- "Very good conference – very organized and put together."
- "Great job of keeping presentations on schedule."

Many other very constructive comments and suggestions were received for next year's conference development. The multi-day format seemed to work well for the second year in a row. It does provide flexibility in conference planning for providing a variety of presentations for the wide range of interest and roles represented by the association's membership.

There were 118 registered attendees for the conference. The exhibitor portion of the conference was supported by 16 exhibitors from private consulting and product firms to state and federal agencies. Four entities provided specific sponsorship support of the conference, and they included the consulting firms of Fishbeck, Thompson, Carr and Huber, Spicer Group, PBS&J, and the Federal Emergency Management Agency.

The program provided 24 presentations of varied issues related to stormwater and floodplain management. Two presentations were of workshop formats and were well received and productive. One was a "Floodplain Management 101" session attended by many local building officials looking for a better understanding of what they need to know and consider when processing a building permit application for construction within the floodplain. Another workshop presentation was an opportunity for community officials to learn more about the FEMA NFIP Community Rating System (CRS) program. It provided one-on-one work sessions with the CRS representative Scott Cofoid to review individual community programs and to begin preparation of the CRS application packet for enrollment into the program.

Next year's conference will be the Association's 20th and is set for February 20-23, 2007. The conference location will be moved from the northern lower peninsula down to the southwest portion of the state in response to past membership suggestions to move the conference location around the state. Final contract terms have been worked out with the Amway Grand Hotel in Grand Rapids, Michigan. Next year's conference format will be similar to that of the last two years. General sessions with breakout concurrent sessions and exhibitors are planned. A CFM exam refresher course and the proctoring of the exam will again be part of the conference. The refresher course is scheduled for February 20, 2006, with the exam proctored the following morning the 21st just prior to the start of the conference in the afternoon. This will allow the CFM exam takers the chance to attend all of the conference sessions.

The 2007 conference development committee welcomes your ideas and suggestions for subject matter to build into the program. You may submit your ideas and suggestions to:

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Lansing, Michigan 48876
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CFMs Acknowledged by the MSFA and 13 New CFMs Added to Michigan's List

At its 19th annual conference held February 13-15, 2006, the Michigan Stormwater-Floodplain Association (MSFA) recognized and honored 14 persons for their interest, efforts, and success in becoming officially certified by the Association of State Floodplain Managers (ASFPM) this past year as "Certified Floodplain Managers". The ASFPM developed this certification process as a national program to support and recognize continuing education and professional development for the enhancement of the knowledge and performance of local, state, federal, and private-sector floodplain managers.

Those persons receiving the MSFA certificate of recognition for their CFM accomplishments are:

- Mary Bednar, P.E.
- Matthew Bugbee
- Peter Chapman, P.E.
- Jerry Hancock
- Patrick Hudson
- Patrick Hughes, P.E.
- Jason Mayer
- Jeffrey Montpas, P.E.
- Ronda Oberlin
- Jaspreet Randhawa
- Daniel Rose, P.E.
- Christopher Rybak, P.E.
- Kyle Seidel, P.E.
- Peter Snyder, P.E.

In continued support for the ASFPM CFM program, the MSFA sponsored the CFM exam proctoring at this year's conference, and 13 persons successfully passed the exam. Those newly recognized Certified Floodplain Managers will receive their MSFA certificate of recognition at next year's conference. The new Michigan CFMs are:

- James Abron Jr., P.E., CFM, Jones & Henry Engineers, Ltd., Livonia
- Alicia Askwith, CFM, Stantec, South Lyon
- Michael Beebee, P.E., CFM, Huron Consultants, Dewitt
- Gregory Hoffman, P.E., CFM, Huron Consultants, Fort Gratiot
- Timothy Inman, P.E., CFM, Spicer Group, Inc., Saginaw
- Brent LaVanway, P.E., CFM, Boss Engineering, Fenton
- Michael Marks, CFM, Grosse Pointe Park, Giffels-Webster Engineers, Inc.
- Daryl Poprave, CFM, City of Midland
- Thomas Smith, III, P.E., CFM, Prein & Newhof, Wyoming
- Robert Stiverson, P.E., CFM, Wilcox Professional Services, Bad Axe
- Michael Townley, CFM, Kalamazoo, Fishbeck, Thompson, Carr & Huber, Inc.
- Joseph Vaglica, CFM, GES-Gateway Engineering & Surveying, Inc., Washington
- Mark Walker, CFM, Abonmarche Consultants, Inc., Bridgman

These new CFMs will be added to Michigan's list of 31 others that have been certified and have maintained their certifications through satisfying the program's required continuing education requirements. Michigan now has a total of 44 ASFPM Certified Floodplain Managers.

MSFA's website at http://mi.floods.org provides a list of Michigan CFMs.

More information on the ASFPM CFM program can be found at: www.floods.org

CFM® is a registered trademark of the ASFPM Certified Floodplain Manager Program and may only be used by Nationally Accredited CFMs.

FEMA New Flood Map Adoption Update

The communities of Berrien County are the first in Michigan to experience the required map adoption process for the new FEMA Digital Flood Insurance Rate Maps (DFIRMs). The process has demonstrated a few truths of human nature. One truth is: Wait until deadlines are upon us. Another is: The instructions and examples are never in the right hands when they are needed. Both were subconsciously expected, even though there was hope to avoid them.

The new Berrien County Flood Insurance Study and all of the accompanying maps for all communities became effective April 17, 2006. Berrien County communities currently participating in the NFIP must have the new maps for their community jurisdictions formally adopted by that date or face suspension from the NFIP. Communities not currently participating in the NFIP and being identified on the new DFIRMs to have special flood hazard areas have 12 months to apply for enrollment into the NFIP and complete the map adoption process. Realistically, communities do not have 6 or 12 months to complete all adoption documentation. At least one month needs to be factored into the time frames just to get through the administrative process at the state and federal level before the effective date.

As the April 17, 2006 adoption deadline for Berrien County communities loomed closer, more officials asked for guidance through the adoption process. The good news is that the model map adoption documents developed with assistance from the Attorney General's office are being well accepted by community legal counsel and are making the seemingly ominous map adoption task easier than first expected by community staff.

The flood map model adoption documents and guidance for communities is available at: http://michigan.gov/deq/0,1607,7-135-3313_3684_3725-122959--,00.html

As a county nears the completion of its flood insurance study and the finalization of its new flood maps, the MDEQ will mail a CD to each community within the county. The CD will contain the same information and documents available at the above website. Questions and assistance through the process and reviewing of draft map adoption documents for completeness is available by contacting:

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Lansing, MI 48876
517-335-3448
thomasl@michigan.gov

Question and Answer

Q: If I'm interested in buying a structure such as a seasonal home located in flood zone A or AE on a great lake shoreline, and the same area also happens to be considered a Coastal Barrier area, what does this mean? What should I be aware of to help make an informed decision on its purchase?

A: Proceed with caution. Coastal Barrier Resource System (CBRS) areas exist through the administration of the Coastal Barrier Resources Act of 1982 (L. 97-348) and the Coastal Barrier Improvement Act of 1990 (L. 101-591). The general purpose of these federal laws is to prohibit

development in certain shoreline areas having unique ecological values and integrity, and because of their very nature, represent high risk for residential and commercial development. Coastal Barriers areas are unique landforms that serve as a protective barrier against the forces of wind actions caused by coastal storms and provide a protective habitat for a variety of aquatic species.

The government took the position that it is not wise to use funds to provide compensation for loss of human life and property in such areas when other development locations can avoid the continuing impacts from the natural hazards of these coastal barrier shoreline areas. Under the two laws, federal flood insurance is unavailable in CBRS areas for new construction or substantial improvement to existing structures occurring on or after the CBRS area's effective date. This is the case even if the area is also identified on FEMA flood maps as A or AE flood zones that require flood insurance policies for federally backed mortgages. This presents a catch 22 situation that can only be avoided in two ways: 1. Don't make the purchase. 2. If the decision is made to purchase, only use private financing. Federally backed financing and federal flood insurance or financial assistance will not be available to you, unless your situation meets specific conditions.

National flood insurance is available for a structure in a Coastal Barrier area only when the building was constructed (or permitted and under construction) before the CBRS area's effective date either October 1, 1983 under L. 97-348 or November 16, 1990 under L. 101-591. However, if such a structure meets this criteria and is covered by flood insurance, the insurance coverage will be cancelled if the structure is ever substantially improved or substantially damaged. Furthermore, if a federal flood insurance policy is issued in error, it will be cancelled and the premium refunded: No claim can be paid, even if the error is not found until a claim is made.

First Time Attending the Annual MSFA Conference

by Nancy-Jeanne Bachmann

I was pleased to attend this year's Annual Conference by invitation of the Executive Board. In the days and hours prior to my arrival, my preparations were solely logistical: navigating, packing, arriving on time. During opening comments, as I began to settle in, it dawned on me that this event would have lasting impacts. The conference afforded me insight on professional outlets for my interests, exposed me to Michigan's existing projects related to my studies, and confirmed the relevance of my research question in infiltration-based stormwater management.

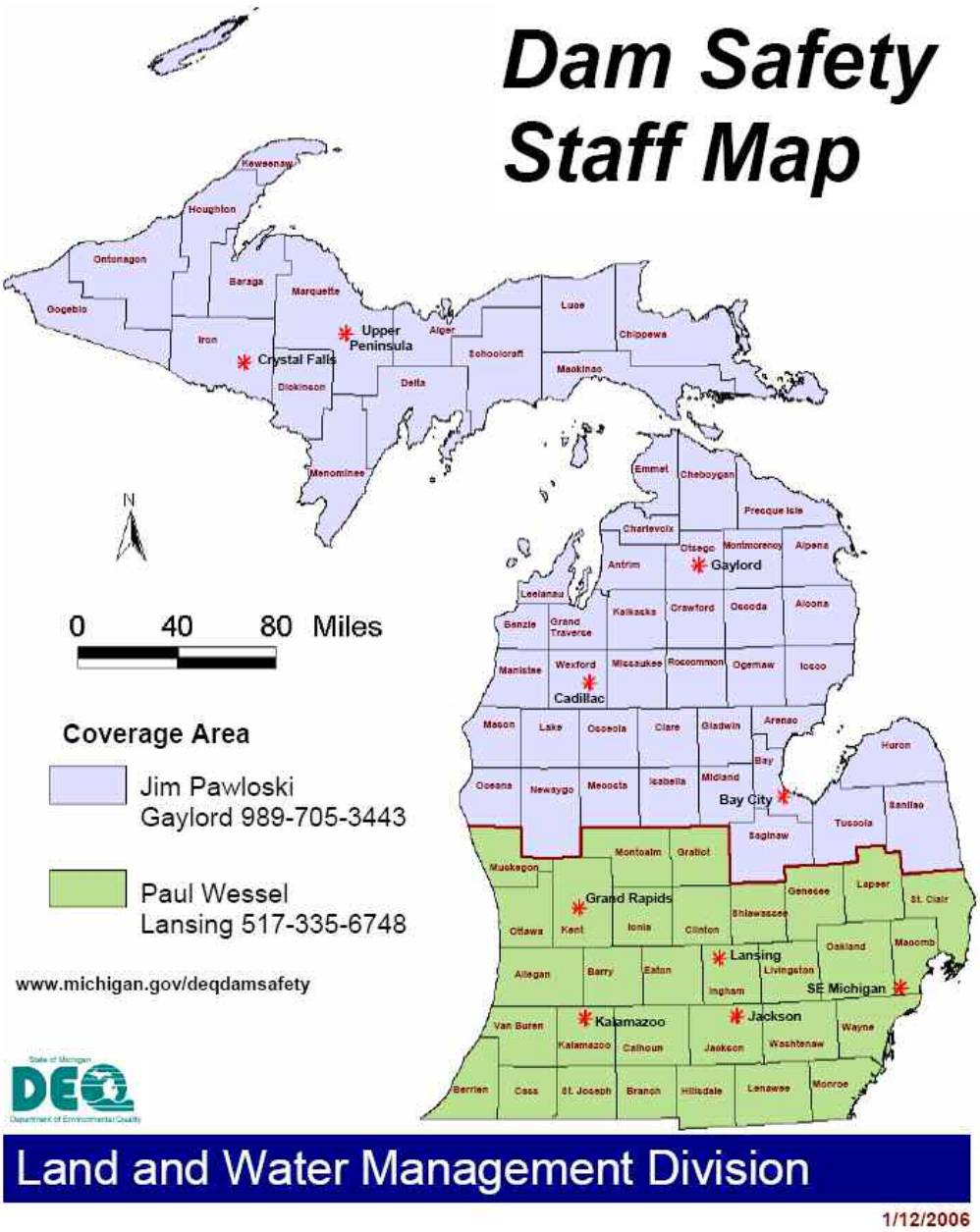
I valued the time I had to communicate with professionals in both the public and private sectors and was impressed by the collaborative nature of the idea exchange that the conference provided. In addition, the people with whom I met were eager to talk, answer questions, and provide suggestions where needed. I could not have felt more welcome among this team of people. As I drove away, I recognized that in just a few days' time I felt that the conference attendees had integrated me into a community of effective professionals and government officials.

I am enthusiastic about Michigan's contributions to safe and progressive stormwater and floodplain management. I look forward to hearing about continued consequences of these efforts.

Dam Safety News

Funding for Michigan's Dam Safety Program Restored

Funding for Michigan's Dam Safety Program was restored on October 1, 2005. The program was eliminated on March 23, 2005 in a budget cut. The program restoration was not complete, however, so only two of the three dam safety field engineers were recalled. The assigned staff coverage area map is below.



Exercising Emergency Action Plans for Dams (Part I)

By Paul Wessel, P.E. Dam Safety Unit, MDEQ

On May 14, 2003, an earthen section of the dam at the Silver Lake Basin in Marquette County failed, releasing nearly nine billion gallons of water to surge through Marquette County and the City of Marquette. Despite the nearly $100 million in damage that resulted, there was no loss of life or major injuries. A major factor in the lack of fatalities or major injuries was the preparation and testing of an Emergency Action Plan (EAP) for the dam. According to Teresa Schwalbach, the Emergency Management Coordinator for Marquette County, "The emergency response was significantly improved because of the exercise (test) in 1998. Exercising your plan is a must. Don't let your plan collect dust on the shelf. By exercising or testing your plan, staff in your organization will know what they have to do. And, emergency response agencies will have better knowledge of what to expect from you, and you from them, if an event should occur."[1] She also noted "as an emergency management coordinator, I cannot stress enough the importance of planning ahead for an event. Don't assume that, since you live in a small community or don't have any major infrastructure, nothing will happen. It will."[2]

The Silver Lake incident emphasizes the importance of preparing, updating and exercising the EAP of a dam.

Part 315, Dam Safety, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended, requires that owners of high and significant hazard potential dams in Michigan prepare and keep current EAPs for their dam. An EAP is defined as "a plan developed by the owner that establishes procedures for notification of the department, public off-site authorities, and other agencies of the emergency actions to be taken prior to and following an impending or actual failure of a dam."

The hazard potential rating is determined by the MDEQ Dam Safety Program and is based upon an assessment of the potential for loss of life, property damage, and environmental damage in the area downstream of a dam in the event of failure of the dam or appurtenant works. Hazard potential rating is not based upon the structural or hydraulic condition of the dam.

In Michigan, we have an excellent rate of compliance with the EAP requirement: Of the 217 high and significant hazard potential dams regulated by the state, 211 have approved EAPs, which amounts to a 97 percent compliance rate.

Once the EAP has been approved, however, the job is not done. Without periodic updating, the EAP will become outdated, lose its effectiveness, and will no longer be workable. If the plan is not exercised, those involved in its implementation may not be familiar with their roles and responsibilities.

Emergency incidents at dams and/or dam failures are not common events. Therefore, training and exercises are necessary to maintain operational readiness, timeliness, and responsiveness. The status of training and levels of readiness should be evaluated in non-threatening simulated periodic emergency exercises for key personnel of the dam owner.

The dam owner should exercise the EAP because it promotes emergency preparedness, mitigation, and response, and demonstrates how effective the EAP will be in an actual emergency situation. Periodic exercises will result in an improved EAP as lessons learned during the exercise can be incorporated into an updated EAP document.

On March 29, 2005, the MDEQ Dam Safety Program held a seminar entitled "Testing of Emergency Action Plans for Dams: Better Ensuring the Emergency Action Plan Will Work in a Time of Crisis." This seminar was held to train dam owners, consultants, and local

[1] "Planning for Emergencies: Lessons Learned from Silver Lake," Hydro Review, September 2004
[2] Ibid

emergency management officials on the exercise of EAPs for dams. A total of 97 people attended the workshop, half of whom were dam owners, a quarter consultants, and a quarter local emergency management officials. In a survey of attendees, 81 percent of respondents stated the intent to take action at their facility as a result of this workshop.

MDEQ Dam Safety Program staff have also participated in EAP exercises conducted by hydroelectric dam owners regulated by the Federal Energy Regulatory Commission, as well as an exercise conducted by the Emergency Management Division of the Michigan State Police, which simulated the simultaneous failure of several dams.

MDEQ encourages all owners of high and significant hazard potential dams to take the steps to ensure that the EAP for their dams will be effectively implemented in the unlikely event of a dam incident. The local emergency management coordinator is a good source of information regarding the exercising of emergency plans. It may be possible to merge an EAP exercise for an individual dam into a larger exercise to demonstrate county wide emergency preparedness. Dam owners may also wish to contact local hydroelectric dam owners to observe the EAP exercises that they are required to hold as part of their licensing requirements.

For further questions regarding Emergency Action Planning for dams, feel free to contact staff of the MDEQ Dam Safety Program: James Pawloski, P.E., at 989-705-3443, or pawlsokj@michigan.gov; Paul Wessel, P.E., at 517-335-6748, wesselpt@michigan.gov; Byron Lane, P.E. at 517-241-9862, or laneb@michigan.gov; or visit our website at www.michigan.gov/deqdamsafety.

In Part II of this series we will discuss the various types of EAP exercises.

Reminders – Reminders – Reminders are Good – Good – Good – Good!

We as parents are always reminding members of the younger generations of things to do and not to do. Who reminds the adults? Well, my editor's prerogative respectfully extends the following reminders to all readers that mother nature never lets up and we are continuously exposed to her forces. It is springtime, and weather conditions, such as thunderstorms, tornados, and flooding, are the betting odds of the season. So, the following are reminders that we should all keep in mind and share with others because, as was recently demonstrated by the unfortunate weather in Kansas, Missouri, Illinois, Indiana, Ohio, and Tennessee, we and our neighbors may need to take action to save our lives.

The following fact and safety articles provided by the Emergency Management Division of the Michigan State Police.

Tornado Facts

1. What is a tornado?

It is a column of violently rotating winds extending down from a thunderstorm cloud and touching the surface of the earth.

2. What is the difference between a tornado and a funnel cloud?

A funnel cloud is also a column of violently rotating winds extending down from a thunderstorm; however, it does not touch the earth.

3. How many tornadoes usually occur in Michigan every year?

An average of 16 tornadoes occurs in Michigan each year. Since 1950, 239 persons have been killed due to tornadoes. During this same time, Michigan has experienced 874 tornadoes.

4. When do tornadoes generally occur?

Most tornadoes occur during the months of May, June, July, and August in the late afternoon and evening hours. However, tornadoes can occur anytime of the day or night in almost any month during the year.

5. How fast do tornadoes travel?

Tornadoes generally travel from the southwest and at an average speed of 30 miles per hour. However, some tornadoes have very erratic paths, with speeds approaching 70 mph.

6. How far do tornadoes travel once they touch the ground?

The average Michigan tornado is on the ground for less than 10 minutes and travels a distance of about 5 miles. However, they do not always follow the norm and have been known to stay on the ground for more than an hour and travel more than 100 miles.

7. What is a tornado watch?

A tornado/severe thunderstorm watch is issued whenever conditions exist for severe weather to develop. Watches are usually for large areas about two-thirds the size of Lower Michigan and are usually two to six hours long. Watches give us time to plan and prepare.

8. What is a tornado warning?

The local Weather Service (NWS) office issues a tornado warning whenever a tornado has been sighted or NWS Doppler Radar indicates a thunderstorm capable of producing a tornado has been sighted. A severe thunderstorm warning is issued whenever a severe thunderstorm is observed or NWS Doppler Radar indicates a thunderstorm capable of producing damaging winds or large hail is

observed. Warnings are for smaller areas, such as counties, and are usually 30 to 90 minutes in length. You must act immediately when you first hear the warning. If severe weather is reported near you, seek shelter immediately. If not, keep a constant lookout for severe weather and stay near a shelter.

9. How do I find out about a warning if my electricity is already out?

NOAA Weather Radio All Hazards with battery backup capability is your best source to receive the warning. In some areas, civil emergency sirens may be your first official warning. In addition, if your television or radio has battery backup capability, you may receive NOAA's National Weather Service warnings from local media.

Michigan Tornado Chart

The following is a list of tornadoes experienced by each county in Michigan.

County	1950-2005	2005	County	1950-2005	2005
Alcona	10	0	Lake	2	1
Alger	6	1	Lapeer	19	0
Allegan	24	0	Leelanau	3	0
Alpena	12	0	Lenawee	30	0
Antrim	8	0	Livingston	23	0
Arenac	6	0	Luce	2	0
Baraga	2	0	Mackinac	5	0
Barry	17	0	Macomb	18	0
Bay	12	0	Manistee	1	0
Benzie	4	0	Marquette	6	0
Berrien	28	0	Mason	4	0
Branch	15	0	Mecosta	9	0
Calhoun	15	0	Menominee	6	0
Cass	14	0	Midland	8	0
Charlevoix	4	0	Missaukee	8	0
Cheboygan	5	0	Monroe	27	0
Chippewa	6	0	Montcalm	10	0
Clare	7	0	Montmorency	6	0
Clinton	17	0	Muskegon	7	0
Crawford	10	0	Newaygo	12	1
Delta	10	0	Oakland	30	0
Dickinson	7	0	Oceana	5	0
Eaton	22	0	Ogemaw	13	0
Emmet	5	0	Ontonagon	2	0
Genesee	39	0	Osceola	15	0
Gladwin	9	0	Oscoda	3	0
Gogebic	3	1	Otsego	3	0
Grand Traverse	4	0	Ottawa	18	0
Gratiot	12	0	Presque Isle	6	0
Hillsdale	23	0	Roscommon	8	0
Houghton	1	0	Saginaw	21	1
Huron	11	0	Sanilac	13	0
Ingham	24	0	Schoolcraft	3	0
Ionia	16	0	Shiawassee	23	0
Iosco	11	0	St. Clair	20	0
Iron	5	0	St. Joseph	9	0
Isabella	13	0	Tuscola	15	0
Jackson	16	0	Van Buren	16	0
Kalamazoo	21	0	Washtenaw	22	0
Kalkaska	6	0	Wayne	27	0
Kent	30	0	Wexford	6	0
Keweenaw	2	0			

***A single tornado can cross county lines. Therefore, the sum of the counties will not equal the state totals.**

Tornado/Thunderstorm Safety

Preparing for a tornado / thunderstorm:

- **Plan ahead.** Be sure everyone in your household knows **where to go** and **what to do** in case of a **tornado or thunderstorm warning.**
- Know the **safest location** for shelter in your **home, workplace, and school**. Load-bearing walls near the center of the basement or lowest level generally provide the greatest protection.
- Know the location of **designated shelter areas** in local **public facilities**, such as schools, shopping centers, and other public buildings.
- Have **emergency supplies** on hand, including a battery-operated radio, flashlight, and a supply of fresh batteries, first aid kit, water, and cell phone.
- Make an **inventory** of household furnishings and other possessions. Supplement it with photographs of each room. Keep in a safe place.

What to do when a tornado / thunderstorm warning is issued for your area:

- Quickly **move to shelter** in the basement or lowest floor of a permanent structure.
- In **homes and small buildings**, go to the basement and get under something sturdy. If no basement is available, go to an interior part of the home on the lowest level. A good rule of thumb is to put as many walls between you and the tornado as possible.
- In **schools, hospitals, and public places,** move to designated shelter areas. Interior hallways on the lowest floors are generally best.
- **Stay away** from windows, doors, and outside walls. Broken glass and wind blown projectiles cause more injuries and deaths than collapsed buildings. Protect your head with a pillow, blanket, or mattress.
- **Mobile homes and vehicles** offer virtually no shelter. Leave them and go to the nearest shelter.
- If there is **no shelter nearby**, the **best alternative** is to find a low spot away from trees, fences, and poles, but not in a place subject to flooding. Shield your head with your arms.
- If you are **boating or swimming**, get to land and shelter immediately.
- Follow the **30/30 Lightning Safety Rule.** Go indoors if, after seeing lightning, you cannot count to 30 before hearing thunder. Stay indoors for 30 minutes after hearing the last clap of thunder. Lightning often strikes outside of heavy rain and may occur greater than 10 miles from any rainfall.
- If you feel your **skin tingle** or **hair stand on end**, lightning may be about to strike. Squat low to the ground on the balls of your feet. Place your hands on your knees with your head between them. Minimize contact with the ground.

- **Telephone lines** and **metal pipes** can **conduct electricity**. Unplug appliances not necessary for receiving weather information. Use plug-in telephones only in an emergency.

After a tornado / thunderstorm:

- **Inspect** your property and motor vehicles for damage. Write down the date and list damages for insurance purposes. Check for **electrical problems** and **gas leaks** and report them to the utility company at once.

- **Watch out** for **fallen power lines**. Stay out of **damaged buildings** until you are sure they are safe and will not collapse. Secure your property from further damage or theft.

- Use only approved or chlorinated supplies of **drinking water**. Check food supplies.

Anytime:

- **Listen** for NOAA Weather Radio All Hazards, or local radio, television, and cable stations for the latest weather updates. Make sure your NOAA Weather Radio has a battery backup.

- For NOAA Weather Radio information, including a station near you, see the NOAA Weather Radio page on the Internet at weather.gov/nwr/. A number of related publications produced by the National Weather Service, American Red Cross, and Federal Emergency Management Agency are available online at weather.gov/om/brochures.shtml

Flood Facts

1. What is a flood and when do most occur?

A flood is the inundation of a normally dry area caused by an increased water level in an established watercourse, such as a river, stream, or drainage ditch, or ponding of water at or near the point where the rain fell. Floods can occur anytime during the year. However, many occur seasonally after winter snow melts or heavy spring rains.

2. What are flash floods?

Flash floods occur suddenly, usually within six hours of the rain event, and result from heavy localized rainfall or levee failures. Flash floods can begin before the rain stops. Water level on small streams may rise quickly in heavy rainstorms, especially near the headwaters of river basins. Heavy rains can also cause flash flooding in areas where the floodplain has been urbanized.

3. What are other causes of flooding in Michigan?

Ice jams and dam failures can also cause both flooding and flash flooding.

4. Are people killed as a result of floods?

Many people are killed by flash floods when driving or walking on roads and bridges that are covered by water. In fact, flash floods are the number one weather-related killer in the United States. Even six inches of fast-moving flood water can knock you off your feet, and a depth of only two feet of water will

float many of today's automobiles. If you are in a car and water starts rising, get out and move to higher ground.

5. What is a flood watch?

A flood watch indicates that flash flooding or flooding is possible within the designated WATCH area – be alert. It is issued to inform the public and cooperating agencies that current and developing weather conditions are such that there is a threat of flooding, but the occurrence is neither certain nor imminent.

6. What is a flash flood or flood warning?

A flash flood or flood warning indicates that flash flooding or flooding is already occurring or imminent within the designated WARNING area – take necessary precautions at once. When a flash flood or flood warning is issued for your area, act quickly. Get out of areas subject to flooding and avoid areas where flooding has already occurred.

7. What is a flash flood or flood statement?

A flash flood or flood statement is used for follow-up information regarding a flash flood or flood event.

Flood Safety

Preparing for a flood:

- Make an itemized list of personal property well in advance of a flood occurring. Photograph the interior and exterior of your home. Store the list, photos, and documents in a safe place.
- Memorize the safest and fastest route to high ground. Assemble a disaster supplies kit containing: first aid kit, canned food and can opener, bottled water, extra clothing, rubber boots and gloves, NOAA Weather Radio, battery-operated radio, emergency cooking equipment, flashlight, and extra batteries.
- If you live in a frequently flooded area, keep sandbags, plastic sheets, and lumber on hand to protect property. Install check valves in building sewer traps to prevent flood water from backing up into the drains of your home.
- Know the elevation of your property in relation to nearby streams and other waterways, and plan what you will do and where you will go in a flood emergency.

When a flood threatens:

- If forced to leave your property and time permits, move essential items to safe ground, fill tanks to keep them from floating away, and grease immovable machinery.
- Store a supply of drinking water in clean bathtubs and in large containers.
- Get out of areas subject to flooding. This includes dips, low spots, floodplains, etc.

During a flood:

- Avoid areas subject to sudden flooding.
- Even six inches of fast moving floodwater can knock you off your feet, and a depth of two feet will float your car! Never try to walk, swim, or drive through such swift water.
- Do not attempt to drive over a flooded road. STOP! Turn around and go another way.
- Keep children from playing in floodwaters or near culverts and storm drains.

After a flood:

- Boil drinking water before using. If fresh food has come in contact with floodwaters, throw it out.
- Seek necessary medical care at the nearest hospital. Food, clothing, shelter, and first aid are available at Red Cross shelters.
- Use flashlights, not lanterns or torches, to examine buildings. Flammables may be inside.
- Do not handle live electrical equipment in wet areas. Electrical equipment should be checked and dried before being returned to service.

Where can I find additional safety information?

Turn Around, Don't Drown are literally words to live by. This slogan highlights the nationwide flood safety public awareness campaign to help reduce flood-related deaths in the United States. The poster, a Turn Around, Don't Drown sign, window sticker, FLASH card, and a NOAA National Weather Service flood safety brochure are also available online at http://www.nws.noaa.gov/os/water/tadd

We are gradually reducing the number of hard copy mailings of the newsletter and relying more upon electronic distribution and availability. If you are not getting an electronic distribution of the newsletter and desire to do so, please notify me. You may respond by e-mail to thomasl@michigan.gov, or mail to Les Thomas, MDEQ-LWMD, PO Box 30458, Lansing, MI 48909.

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Flood News for Michigan Floodplain Managers

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